

hopeless if it is impossible to determine what is being discussed," he writes, "and the resolution of disputes is frustrated if people cannot tell what is really at issue."

Science & Technology

ANIMAL TALK: Science and the Voices of Nature. By Eugene S. Morton and Jake Page. Random House. 275 pp. \$22

ANIMAL MINDS. By Donald R. Griffin. Univ. of Chicago. 310 pp. \$24.95

One of the more debated questions in ethology—the study of animal behavior—is whether animals “think” and “talk.” In *Animal Talk*, Morton, a research zoologist at the Smithsonian, and Page, the former editor of *Natural History*, describe the state of the science today. All those feathery or furry creatures that appear to reason or act deliberately, they show, are in reality performing unconscious adaptations learned via natural selection. Like machines following their programs, animals follow a program that evolution has coded in their genes. Consider, for example, that clever bird, the African honey guide, one of the few wild animals that communicate with human beings. Honey guides attract and lead men to bee hives where, after the men plunder the honey, they obtain the beeswax essential to their diet. Surely, if not conscious, this is at least learned behavior? Not at all, Page and Morton assert; it is “utterly instinctive,” “written in the bird’s genes.” After all, honey guides lay their eggs in alien nests, and their young are raised by other bird species. For Morton and Page, animal talk itself—for all its coded information—consists only of instinctual signals.

No one has more ingeniously applied the mechanistic stimulus-response model to animal cognition than Griffin, a research scientist at Harvard’s Museum of Comparative Zoology. Griffin discovered that bats use echoes of their own high-frequency sound pulses to determine the location of objects in space. A machine could be built that duplicates what Griffin’s bats do. But in *Animal Minds*, Griffin reverses

himself, arguing that animals do indeed think and that consciousness is the best explanation for some animal behavior.

Griffin describes as thinking all those signals by which animals test alternative possibilities rather “than trying them out in the real world, where mistakes are often fatal.” Consciousness is the ability to describe mental experiences using language, and Griffin gives examples of animals referring to things that are removed in space and time. When honeybees, for example, scout for a new hive site, they will return and dance the information they have found. “Bees that have visited a cavity of mediocre quality,” Griffin reports, often “change their allegiance” after witnessing the more enthusiastic dancers returning from a better cavity. Griffin describes this “dance language” as a kind of rudimentary thinking and “simple dialogue.” He points to many such clever animals, including parrots who use words correctly and chimpanzees taught to express simple needs in American Sign Language.

The more Griffin has argued for animal consciousness, the more his reputation has slipped among his colleagues. What Griffin sees as the ceaseless inventiveness of animal minds, they argue, only proves the ceaseless inventiveness of natural selection. The philosopher and zoologist Helena Cronin points out that what stirs Griffin’s wonder—unpredictability, complex rules, conditional strategies—are standard issue in genetic programs. Privately many zoologists, including Cronin herself, believe that since an evolutionary adaptation such as consciousness does not happen overnight (and since a mere half-million generations separate us from the monkeys), chimpanzees probably do possess some consciousness. Yet because there is no way to prove this argument scientifically—just as there is no scientific way to ascertain if or when awareness accompanies an animal’s information-processing—most ethologists never pose the consciousness question. Ethology today slightly resembles the comic strip “Calvin and Hobbes.” When by himself, Calvin has a living tiger for a playmate; when others are around, however, the animal reverts to being a stuffed object.